

CLAIMS

What I claim as my invention is:

1. An angle clamp with Z-axis attachment and quick acting button comprising:
three mutually perpendicular base plates, a square shape bottom-plate and two rectangular side-plates which are attached to two adjacent edges of the said square shape bottom-plate so that both are perpendicular to the said square shape bottom-plate and at right angle to each other;
a floating right-angle head attached to a threaded shaft with handle which is fed through a quick release mechanism located at the vertex of the said square shape bottom-plate opposite to the other vertex where the two said rectangular side-plates will meet if extended;
a Z-axis attachment including a right-angle metal plate, a mounting block and a clamping arm with another quick release mechanism and a threaded shaft with clamping pad;
a quick acting button accessible from outside each said quick release mechanism being used to control the locking and releasing action of each said quick release mechanism over each said threaded shaft.
2. An angle clamp with Z-axis attachment and quick acting button according to claim 1, wherein said square shape bottom-plate is equipped with two slotted holes along two adjacent edges other than the two edges attaching to the two said rectangular side-plates so that the said angle clamp assembly can be fixed to a work desk by screws.
3. The floating right-angle head according to claim 1 is free to swivel horizontally and to slide freely on the flat surface of the said square shape bottom-plate with the attached threaded shaft;
the said threaded shaft, when turned clockwise by the said handle, will advance the said floating right-angle head towards the said rectangular side-plates so that two workpieces can be clamped at right-angle to each other against the inside surfaces of the said side-plates;

the said threaded shaft, when turned counterclockwise by the said handle, will retract the said floating right-angle head away from the said rectangular side-plates so that the clamped workpieces can be released.

4. The floating right-angle head according to claim 3, wherein two tooling holes are provided on each clamping surface for inserting the leveling pads, screw threads are made on the internal surfaces of the said tooling holes.

5. The leveling pads according to claim 4, wherein screw threads and locking nuts are equipped to adjust the amount of protrusion of the said leveling pads so that the adjustable clearance between the workpieces and the said floating right-angle head is provided for increased welding access.

6. The two rectangular side-plates according to claim 1, wherein the outside surfaces are machined flat and square so that the said angle clamp assembly can be laid vertically with the outside surface of either one of the said rectangular side-plates resting on the work desk to clamp a workpiece perpendicular to the work desk without the aid of other fixture or device.

7. The Z-axis attachment according to claim 1 comprising a right-angle metal plate, a clamping arm with quick release mechanism, a mounting block and a threaded shaft with clamping pad and turning knob, wherein:

the said right-angle metal plate is mounted by screws to the two said side-plates and act as an extension of the side-plates;

the inside surfaces of the said right-angle metal plate is machined square and flat and made to be align with the inside surfaces of the two said side-plates so that workpieces can be clamped at a three dimensional mutually perpendicular relationship;

the clamping arm is attached externally by screws through the said mounting block to one side of the said right-angle metal plate;

the threaded shaft is fed through the free end of the said clamping arm where another one of the two quick release mechanisms is located.

8. The Z-axis attachment according to claim 7, wherein the said clamping arm is attached to the said mounting block through a shaft inserted to the said mounting block so that the said clamping arm can be rotated about the axis of the shaft for an angle of approximately 135 degrees;

the said clamping arm can thus be swung away from its clamping position to the open position for rapid and easy removal of the bulky finished workpiece.

9. Both the quick release mechanisms according to claim 1 comprising:

a cylindrical shape quick acting button;

a half-threaded nut attached to the internal flat surface of the said quick acting button with the axis of the threaded hole at right angle to the axis of the said quick acting button, wherein the screw thread is made internally on the half side which is opposite to the side closer to the said quick acting button;

a helical spring is placed and partially compressed between the said half-threaded nut and the inside wall of a sleeve or the cavity which holds the said quick release mechanism;

one of the said cavity is located at one of the vertex of the said square bottom-plate and another one of the said cavity is located at the free end of the said clamping arm of the said Z-axis attachment.

10. Both the quick acting buttons of claim 9, when pressed by one's finger, will push the said half-threaded nut to compress the said helical spring and the said internal screw thread to disengage from the threaded shaft fed through the said half-threaded nut so that the said threaded shaft can be moved freely through the threaded hole of the said half-threaded nut instead of moving pitch by pitch with the turning of the said threaded shaft;

when the quick acting button of claim 9 is released, the said half-threaded nut is pushed back by the said helical spring so that the said internal screw thread is engaged with the said threaded shaft and return to the pitch by pitch movement.